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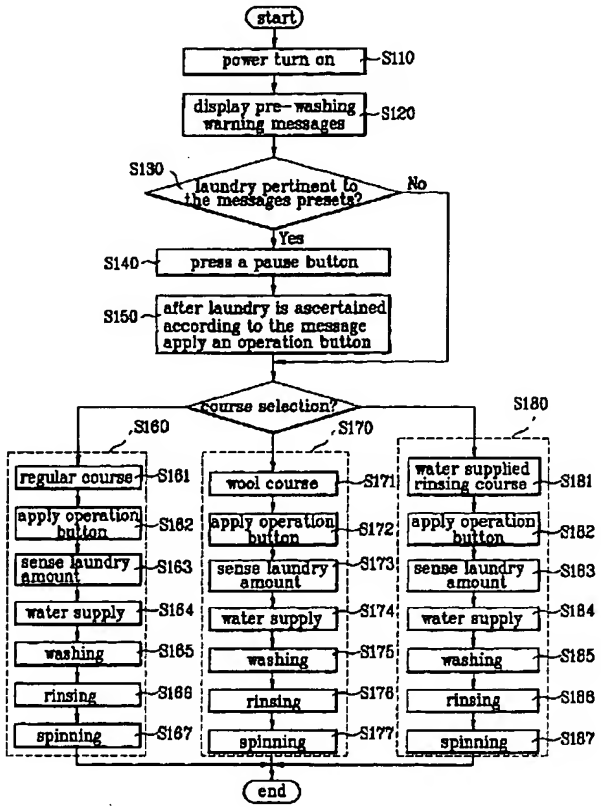
(54) Title: METHOD FOR DISPLAYING A WARNING MESSAGE OF A WASHING MACHINE



(57) Abstract: A method for displaying a warning message of a washing machine is disclosed, which displays the warning message that has to be considered before using the washing machine to allow a user to see it before operating the washing machine on applying a power source. Therefore, it is possible to prevent the laundry from being damaged by various causes. The method for displaying the warning message of the washing machine having a display device includes the steps of displaying the warning message, which has to be considered before using the washing machine, in the display device, and processing the laundry according to the warning message if the current laundry should conform to the warning message displayed before using the washing machine. The method prevents the laundry from being damaged and rewashed by displaying the warning message, which has to be considered before using the washing machine, on applying the power source, and improves efficiency of the washing machine.

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METHOD FOR DISPLAYING A WARNING MESSAGE OF A WASHING MACHINE

Technical Field

The present invention relates to a washing machine, and more particularly, to a method for displaying a warning message of a washing machine.

Background Art

In general, the washing machine rotates a rotating tub, and a pulsator by a driving force of a motor, for conducting washing, rinsing, and spinning, wherein laundry is washed by using friction between the laundry, the washing water, and the rotating tub occurred as washing water and the laundry introduced in the rotating tub are pulsated. The related art washing machine conducts respective cycles automatically according to numbers of times, periods, and etc., of the washing, rinsing, and spinning, either selected, and set by a user directly, or preset by a manufacturer.

A system and operation of the related art washing machine will be explained, with reference to the attached drawings. FIG. 1 illustrates a block diagram showing a system of a related art washing machine schematically, and FIG. 2 illustrates a flow chart showing operation of the related art washing machine.

The related art washing machine is provided with a key application part 10 for selecting a user's desired function, a water level sensing part 20 for sensing a water level, a controlling part 30 for controlling cycles of the washing machine according to functions selected through the key application part 10, and controlling loads according to a result of water level sensed by the water level sensing part 20, a load driving part 40 for driving different loads, such as water supply valve, a drain valve, the motor, and the like, and a display part 50 for displaying operation states of the functions selected through the key

application part 10 under the control of the controlling part 30. The display part 50 has 88 segments for displaying a remained washing time period, and a plurality of light emission diodes LED.

When the user applies an washing command by pressing keys on the key application part 10, the related art washing machine processes washing as the controlling part 30 applies control signals to the load driving part 40 according to a preset washing cycle sequence, to drive the motor (not shown), the water supply valve (not shown), the drain valve (not shown), and the like, in succession. When the user applies the washing command, the controlling part 30 provides control signals so that particulars of the setting the user selects are displayed on the display part 50, when the display part 50 displays operation time periods, and remained washing time periods required for washing, rinsing, and spinning functions respectively for each of washing courses, in response to the control signals from the controlling part 30.

The process for washing the related art washing machine will be explained with reference to FIG. 2.

Power is applied to the washing machine (S1). Then, the user selects a desired washing course, and applies an operation button, to start the washing cycle (S2-S3). Pass of a preset first set time period is determined (S4). As a result of the determination (S4), if the preset first set time period is passed, the washing cycle ends, and the drain valve is turned on (S5-S6). When the drain is completed as the drain valve is turned on, detection of a zero water level at the water level sensing part is determined (S7). As a result of the detection (S7), if the zero water level is sensed at the water level sensing part, the drain valve is turned off, and an intermittent spinning is conducted (S8-S9). Then, passing of a preset second set time period is determined (S10). As a result of the determination (S10), the preset second preset time period is passed, after a showering water supply is conducted, a main spinning cycle is conducted (S11-S12). Upon completion of the main spinning cycle, the water

supply valve is turned on (S13). Then, sensing of a preset set water level at the water level sensing part is determined (S14). As a result of the determination (S14), if the water level sensing part senses the preset set water level, the water supply valve is turned off, and the rinsing cycle is conducted (S15-S16). Then, completion of the rinsing cycle is determined (S15-S16). Upon completion of the rinsing cycle, the drain valve is turned on (S18). Then, sensing of a zero water level at the water level sensing part is determined (S19). As a result of the determination (S19), if the water level sensing part senses the zero water level, the drain valve is turned off, and a final spinning cycle is conducted (S20-S21).

As described, the related art washing machine turns off the water supply valve to stop water supply upon completion of the water supply up to a water level meeting to an amount of laundry, starts the washing cycle, stops the motor (not shown) if the washing cycle is progressed as much as the preset time period, to end the washing cycle, and, on the same time, puts the drain valve (not shown) into operation, for draining the washing water. The water level sensing part 20 senses the water level until the water level reaches to the zero water level when the washing machine starts the spinning. Then, the washing machine turns off the drain valve (not shown) when the preset set spinning time period is passed, and starts rinsing. In the rinsing too, alike the foregoing operation, the water supply valve (not shown) is turned off, and the motor (not shown) is put into operation, to conduct the rinsing, when the controlling part 30 senses a rinsing time period to drive the drain valve (not shown) to drain the washing water if the preset set time period is passed. When the zero water level is sensed, the drain valve (not shown) is turned off, and the final spinning is conducted, to finish an entire washing process.

As has been explained, the related art washing machine can only display operation states, but not warning messages as the display part is of an LED type, damage to the laundry and re-washing may be caused from overlooking, that deteriorate a washing performance.

Disclosure of Invention

Accordingly, the present invention is directed to a method for displaying a warning message of a washing machine that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

An object of the present invention is to provide a method for displaying a warning message of a washing machine, in which warning messages required to pay attention are displayed upon a power is applied to the washing machine before the washing machine is put into operation, for preventing damage to laundry from various causes in advance.

Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described, the method for displaying a warning message of a washing machine having a water storage tub for storage of washing water, a drum rotatably fitted inside of the water storage tub, a motor for rotating the drum, a controlling part for controlling washing cycles, a microcomputer for controlling various loads and motor, and a display part for displaying progress of the washing cycles and particulars of control by the controlling part, includes the step of displaying pre-washing warning messages on the display part in characters or graphics according to kind of laundry, and washing water environment of use after a power is applied to the washing machine, for giving notice to the user.

The method further includes the step of handling laundry according to the pre-washing warning messages if laundry pertinent to the pre-washing warning messages

displayed on the display part presents.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

Brief Description of Drawings

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention:

In the drawings:

FIG. 1 illustrates a block diagram showing system of a related art washing machine, schematically;

FIG. 2 illustrates a flow chart showing the steps of an operation of a related art washing machine;

FIG. 3 illustrates a block diagram showing a system of a washing machine in accordance with a preferred embodiment of the present invention;

FIG. 4 illustrates a flow chart showing the steps of a method for displaying a warning message of a washing machine in accordance with a preferred embodiment of the present invention; and,

FIG. 5 illustrates one embodiment of a method for displaying a warning message of a washing machine of the present invention.

Best Mode for Carrying Out the Invention

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. FIG. 3 illustrates a block diagram showing a system of a washing machine in accordance with a

preferred embodiment of the present invention, and FIG. 4 illustrates a flow chart showing the steps of a method for displaying a warning message of a washing machine in accordance with a preferred embodiment of the present invention.

Referring to FIG. 3, the washing machine in accordance with a preferred embodiment of the present invention includes a PC 100, an interface 200 for data exchange with the PC 100, a key application part 300 for users selection of a desired washing course and application of operation commands for the desired washing course, a water level sensing part 400 for sensing a water level, a storage part 500 for storage of a washing machine operation algorithm and pre-washing warning messages, a liquid crystal display (LCD) 800 for displaying the pre-washing warning messages and a progress of relevant cycle, a controlling part 600 for reading the pre-washing warning message from the storage part and displaying on the LCD 800, and controlling data communication with an external device through the interface 20 according to a request from the user when a power is applied to the washing machine, and a load driving part 700 for controlling driving of required load in response to control signals from the controlling part 600.

When a user presses a power key on the key application part 300, the washing machine reads the pre-washing warning messages from the storage part 500, and displays on the display part 800. Then, the user makes sure that pre-washing warnings are observed with reference to the pre-washing warning messages. Then, the user presses an operation button, to conduct a required washing cycle for a selected course.

The method for displaying a warning message of a washing machine of the present invention will be explained, with reference to FIG. 4.

A power is applied to the washing machine (S110). Upon application of power, the pre-washing warning messages are displayed on the LCD (S120). Then, presence of pertinent laundry is determined with reference to the pre-washing warning message displayed

on the LCD (S130). As a result of the determination (S130), if the laundry pertinent to the pre-washing warning messages displayed on the LCD presents, a pause button is pressed, a required action is taken according to the pre-washing warning message, and the operation button is pressed (S140-S150). When the operation button is pressed, and the user selects a regular course, the washing cycle is conducted according to the preset regular course (S160). That is, when the user selects a regular course and presses the operation button, at first an amount of laundry is detected (S161-S163). Then, according to the detected amount of laundry, water is supplied, and the cycles are progressed in an order of washing → rinsing→ spinning (S164-S167). If the user selects a wool course, the washing is progressed according to a preset wool course cycle (S170). That is, when the user selects a wool course, and presses the operation button, an amount of laundry is detected (S171-S173). After water is supplied according to the detected amount of laundry, cycles are progressed in the order of washing → rinsing→ spinning (S174-S177). Finally, when the user selects a water supplied rinsing cycle, the washing cycle is progressed according to a preset water supplied rinsing cycle (S180). That is, when the user selects the water supplied rinsing course, and presses the operation button, at first, an amount of laundry is detected (S181-S183). Then, water is supplied according to the detected amount of laundry, cycles are progressed in the order of washing → rinsing → spinning (S184-S187).

As has been explained, in the method for displaying a warning message of a washing machine of the present invention, when the user turns on a power of the washing machine, the pre-washing warning messages stored in the storage part 500 are displayed on the LCD 800 before the washing cycle is started, the user ascertains the pre-washing warning messages, and makes sure of states of pertinent laundry, and, if the pre-washing preparation is completed, selects a desired washing course, and processes a washing cycle according to the washing

course.

Referring to FIG. 5, examples of the pre-washing warning messages to be displayed on the LCD 800 may be 'make sure if the laundry is water washable', 'make sure if no color of the laundry runs' 'separate cloth with much fluff', 'clear pockets', and the like. According to this, the user makes sure if the laundry is water washable referring to the pre-washing warning messages displayed on the LCD 800, and removes the laundry from the washing tub if the laundry is not water washable. Also, the user makes sure if pockets are cleared, and, if not, presses the pause button, removes all things in pockets, puts the laundry back into the washing tub, and applies the operation button, again. On the other hand, laundry with a high possibility of much fluff is taken out of the washing tub, for separate washing. Upon completion of such preparation for washing, the user selects a desired washing course, and completes all washing cycles through the steps of laundry amount detection, water supply, washing, rinsing, and spinning automatically following the selected course.

Industrial Applicability

As has been explained, the method for displaying a warning message of a washing machine can prevent occurrence of troubles of laundry damage, re-washing, and the like in advance, to improve a washing performance, by displaying pre-washing warning messages before the user puts the washing machine into operation when a power is applied to the washing machine.

It will be apparent to those skilled in the art that various modifications and variations can be made in the method for displaying a warning message of a washing machine of the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is Claimed is:

1. A method for displaying a warning message of a washing machine having a water storage tub for storage of washing water, a drum rotatably fitted inside of the water storage tub, a motor for rotating the drum, a controlling part for controlling washing cycles, a microcomputer for controlling various loads and motor, and a display part for displaying progress of the washing cycles and particulars of control by the controlling part, the method comprising the step of:

displaying pre-washing warning messages on the display part in characters or graphics according to kind of laundry, and washing water environment of use after a power is applied to the washing machine, for giving notice to the user.

2. A method as claimed in claim 1, further comprising the step of handling laundry according to the pre-washing warning messages if laundry pertinent to the pre-washing warning messages displayed on the display part presents.

3. A method as claimed in claim 1, wherein the step includes the step of displaying warning messages on kinds of cloths, warning messages on color run, warning messages on requirement for separate washing, and pocket clearing.

4. A method as claimed in claim 3, wherein the warning messages on kinds of cloths include a warning message of "make sure if the laundry is water washable".

5. A method as claimed in claim 3, wherein the warning messages on color run include a warning message of "make sure if no color of the laundry runs".

6. A method as claimed in claim 3, wherein the warning messages on requirement for separate washing include a warning message of "separate cloth with much fluff".

7. A method as claimed in claim 3, wherein the warning messages on pocket clearing include a warning message of "clear pockets".

8. A method as claimed in claim 2, wherein the step of handling laundry according to the pre-washing warning messages includes the steps of;

stopping the washing machine temporarily if laundry pertinent to the displayed pre-washing warning message presents,

classifying the laundry according to the pre-washing warning message when the washing machine stops temporarily,

applying an operation button when the laundry is classified,

displaying washing courses,

selecting a course pertinent to the classified laundry from the displayed courses, and progressing washing cycles according to the selected course.

9. A method as claimed in claim 8, wherein the step of displaying washing courses is the step of displaying a regular course, a wool course, water supplied rinsing course, and the like.

10. A method as claimed in claim 8 or 9, wherein the step of progressing washing cycles includes the step of progressing water supplying, washing, rinsing, and spinning cycles according to the regular course after detecting an amount of laundry if the user selects the regular course.

11. A method as claimed in claim 8 or 9, wherein the step of progressing washing cycles includes the step of progressing water supplying, washing, rinsing, and spinning cycles according to the water supplied rinsing course after detecting an amount of laundry if the user selects the water supplied rinsing course.

12. A method as claimed in claim 8 or 9, wherein the step of progressing washing cycles includes the step of progressing water supplying, washing, rinsing, and spinning cycles according to the water supplied rinsing course after detecting an amount of laundry if the user selects the water supplied rinsing course.

13. A method as claimed in claim 1, further comprising the step of progressing the washing cycles according to the course the user selects if no laundry pertinent to the pre-washing warning message presents.

FIG.1
Prior Art

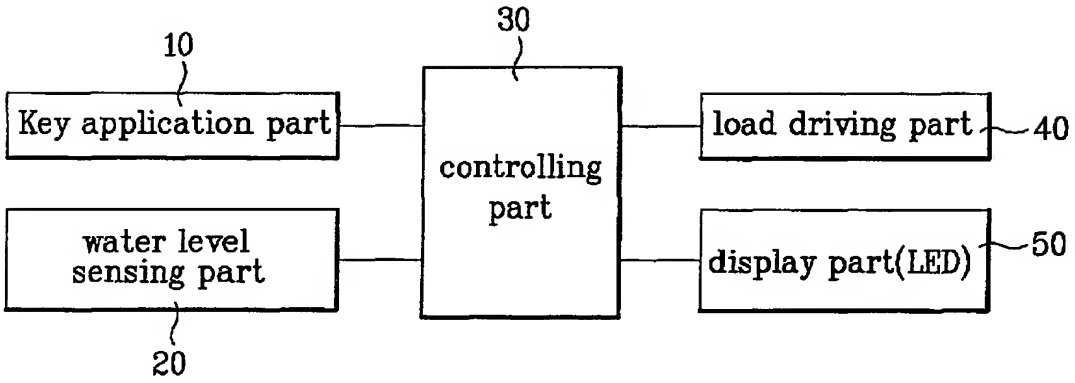

FIG.2

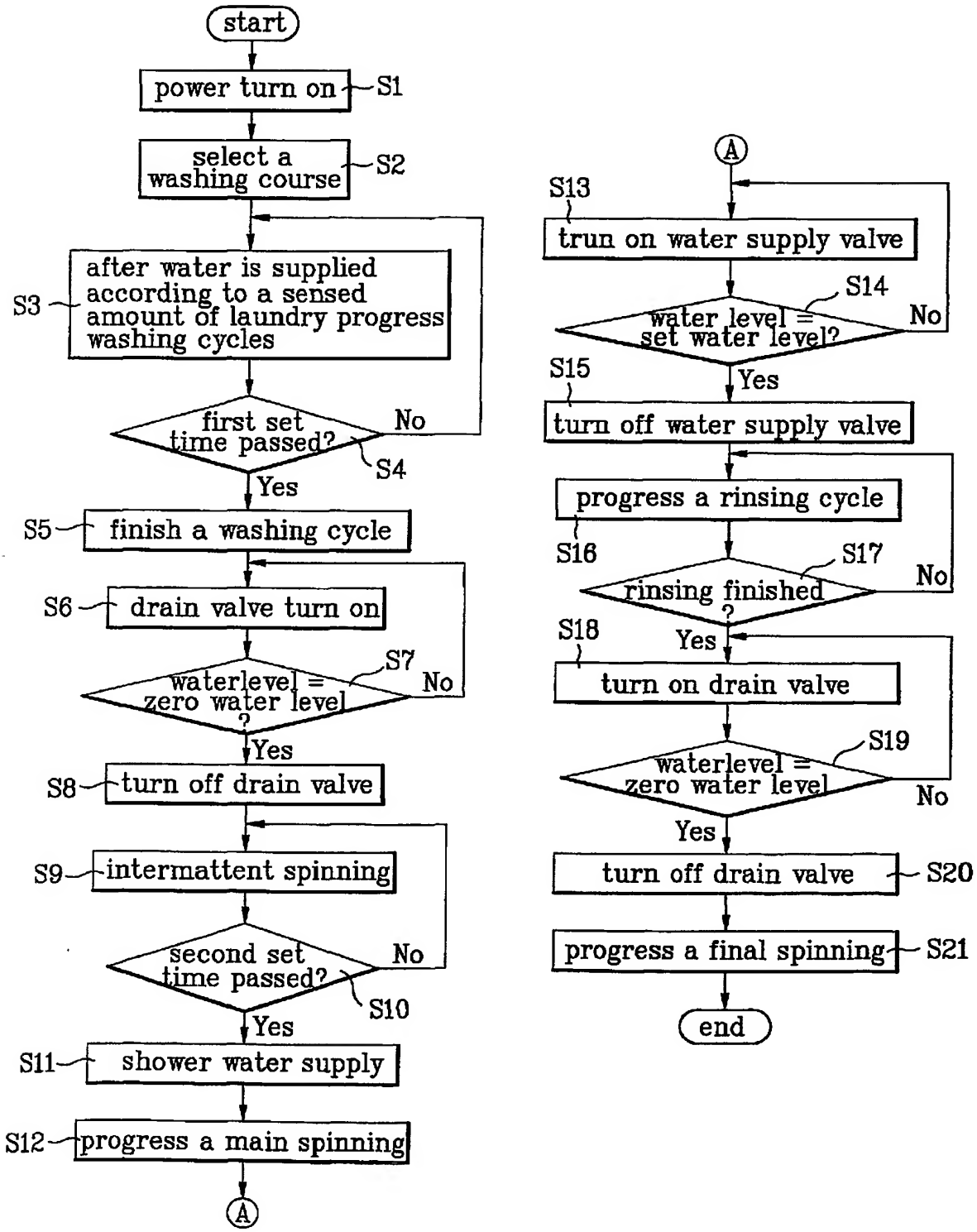
start
power turn on
S1
select a washing course
S2
after water is supplied according to a sensed amount of laundry progress washing cycles
S3
first set time passed?
No
S4
Yes
finish a washing cycle
S5
drain valve turn on
S6
waterlevel = zero water level ?
S7
No
Yes
turn off drain valve
S8
intermattent spinning
S9
second set time passed?
No
S10
Yes
shower water supply
S11
progress a main spinning
S12
A
A
S13
trun on water supply valve
water level = set water level?
S14
No
Yes
S15
turn off water supply valve
progress a rinsing cycle
S16
rinsing finished ?
S17
No
Yes
S18
turn on drain valve
waterlevel = zero water level
S19
No
Yes
turn off drain valve
S20
progress a final spinning
S21
end

FIG. 3

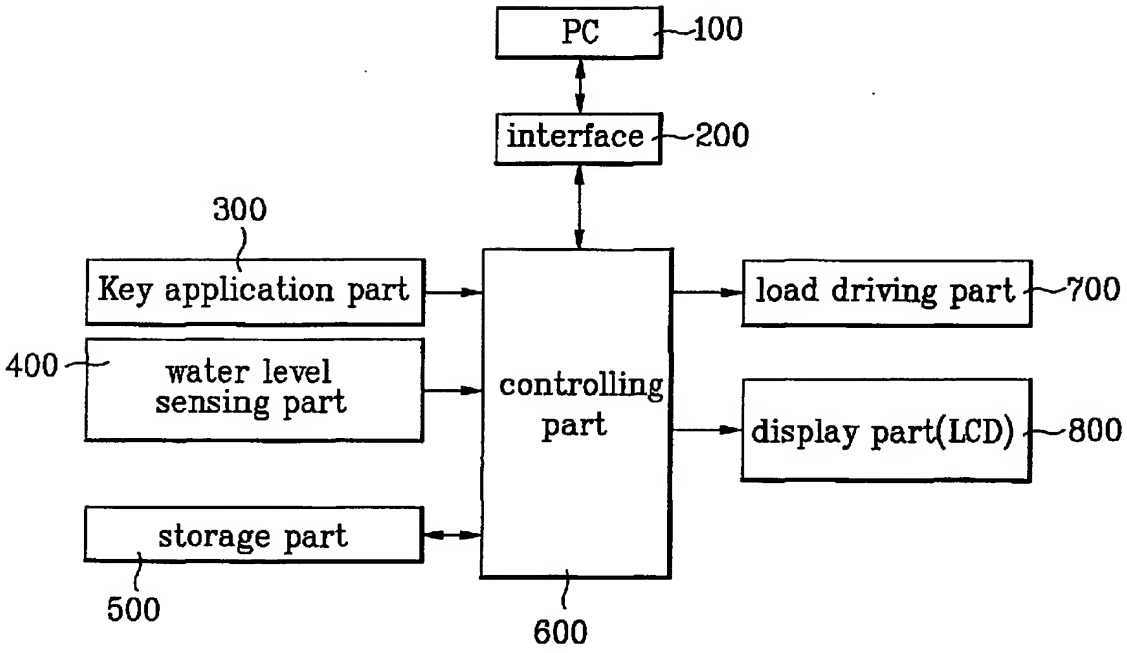
PC
100
interface
200
300
Key application part
400
water level sensing part
storage part
500
controlling part
600
load driving part
700
display part(LCD)
800

FIG. 4

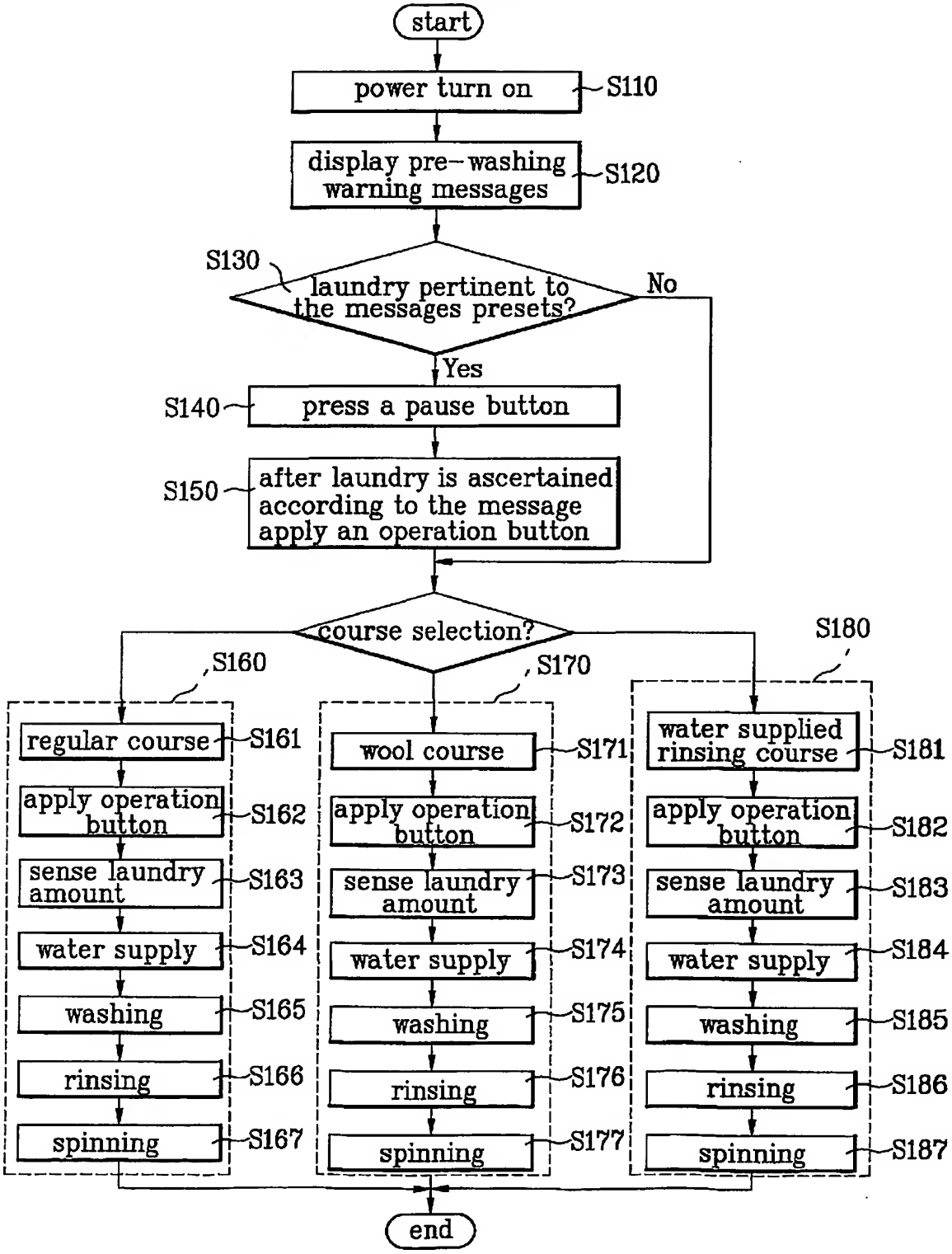
start
power turn on
S110
display pre-washing warning messages
S120
S130
laundry pertinent to the messages presets?
No
Yes
S140
press a pause button
S150
after laundry is ascertained according to the message apply an operation button
course selection?
S160
S170
S180
regular course
S161
apply operation button
S162
sense laundry amount
S163
water supply
S164
washing
S165
rinsing
S166
spinning
S167
wool course
S171
apply operation button
S172
sense laundry amount
S173
water supply
S174
washing
S175
rinsing
S176
spinning
S177
water supplied rinsing course
S181
apply operation button
S182
sense laundry amount
S183
water supply
S184
washing
S185
rinsing
S186
spinning
S187
end

FIG.5

pre-washing waring messages
make sure if the laundry is water washable make sure if no color of the laundry runs separate cloth with much fluff clear pockets

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR01/01143

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 D06F 33/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 D06F 33/02, D06F 33/00

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

Korean patents and application since 1975
Korean utility models and application for utility models since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
"X"	JP 09-84989 A (HITACHI CO) 31, MAR, 1997 WHOLE DOCUMENT	1 , 13
"Y"		2 - 12
"A"	KR 1997-0062134 A (LG CO) 12, SEP, 1997 WHOLE DOCUMENT	1 - 13
"A"	KR 1996-0001285 A (LG CO) 25, JAN,1996 WHOLE DOCUMENT	1 - 13
"A"	KR 1993-0002586 A (GUM SUNG CO) 23, FEB,1993 WHOLE DOCUMENT	1 - 13

(PATENT FAMILY NONE)

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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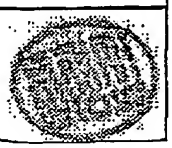
"A" document defining the general state of the art which is not considered to be of particular relevence
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 OCTOBER 2001 (10.10.2001)	12 OCTOBER 2001 (12.10.2001)

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office Government Complex-Daejeon, Dunsan-dong, Seo-gu, Daejeon Metropolitan City 302-701, Republic of Korea	MIN, Kyoung Shin
Facsimile No. 82-42-472-7140	Telephone No. 82-42-481-5652



Form PCT/ISA/210 (second sheet) (July 1998)